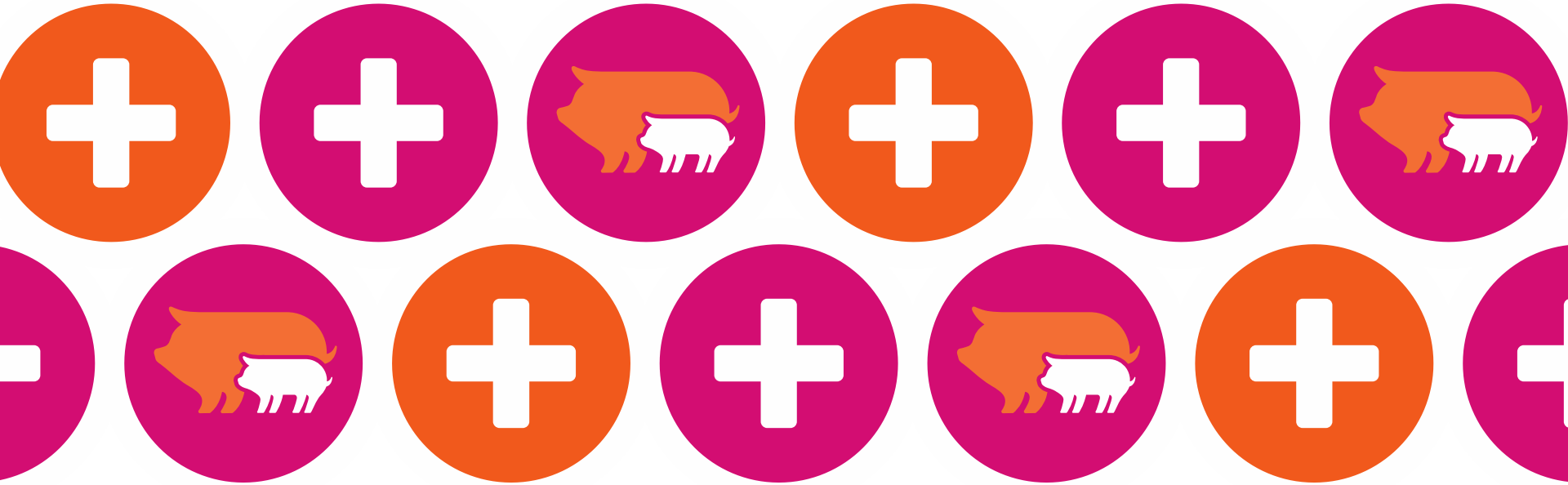


Nitric oxide precursor: Sports nutrition leveraged to increase piglet livability

M. van den Bosch, H. van den Brand, E. F. J. M. van Gelderen

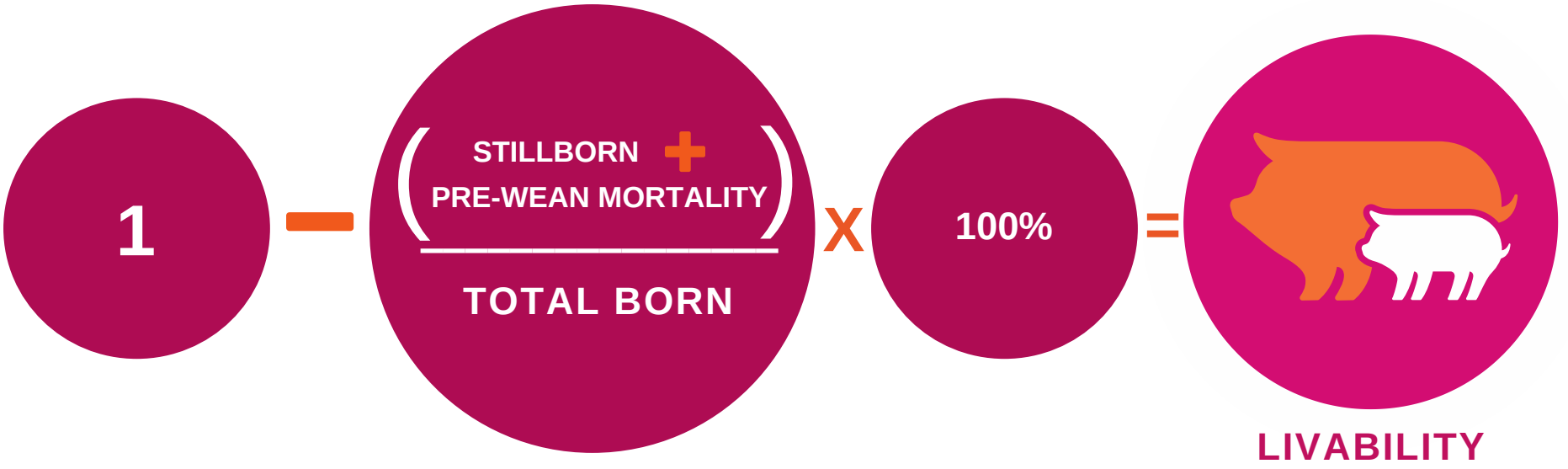
Moniek van den Bosch, MSc
Senior Research Scientist Swine
Cargill Animal Nutrition

WAGENINGEN
UNIVERSITY & RESEARCH

Cargill™

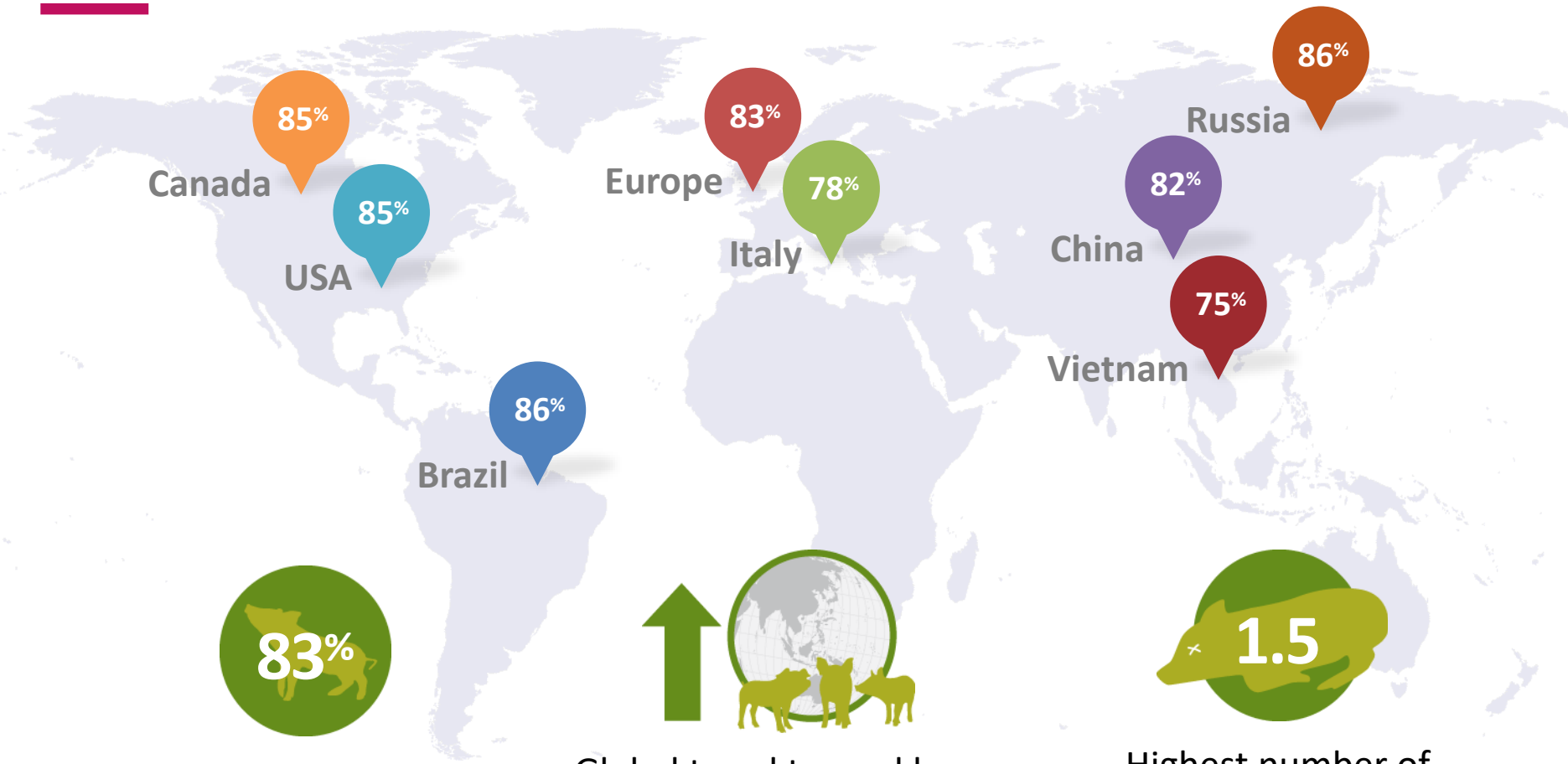
Piglet livability

Livability is the percentage of potential viable piglets a sow can raise.



In addition, piglet livability covers the quality of life of piglets linked to health and performance in both the pre-weaning and post weaning period. Health and performance are driven by amongst other birth weight and vitality that can have a direct effect on piglet livability.

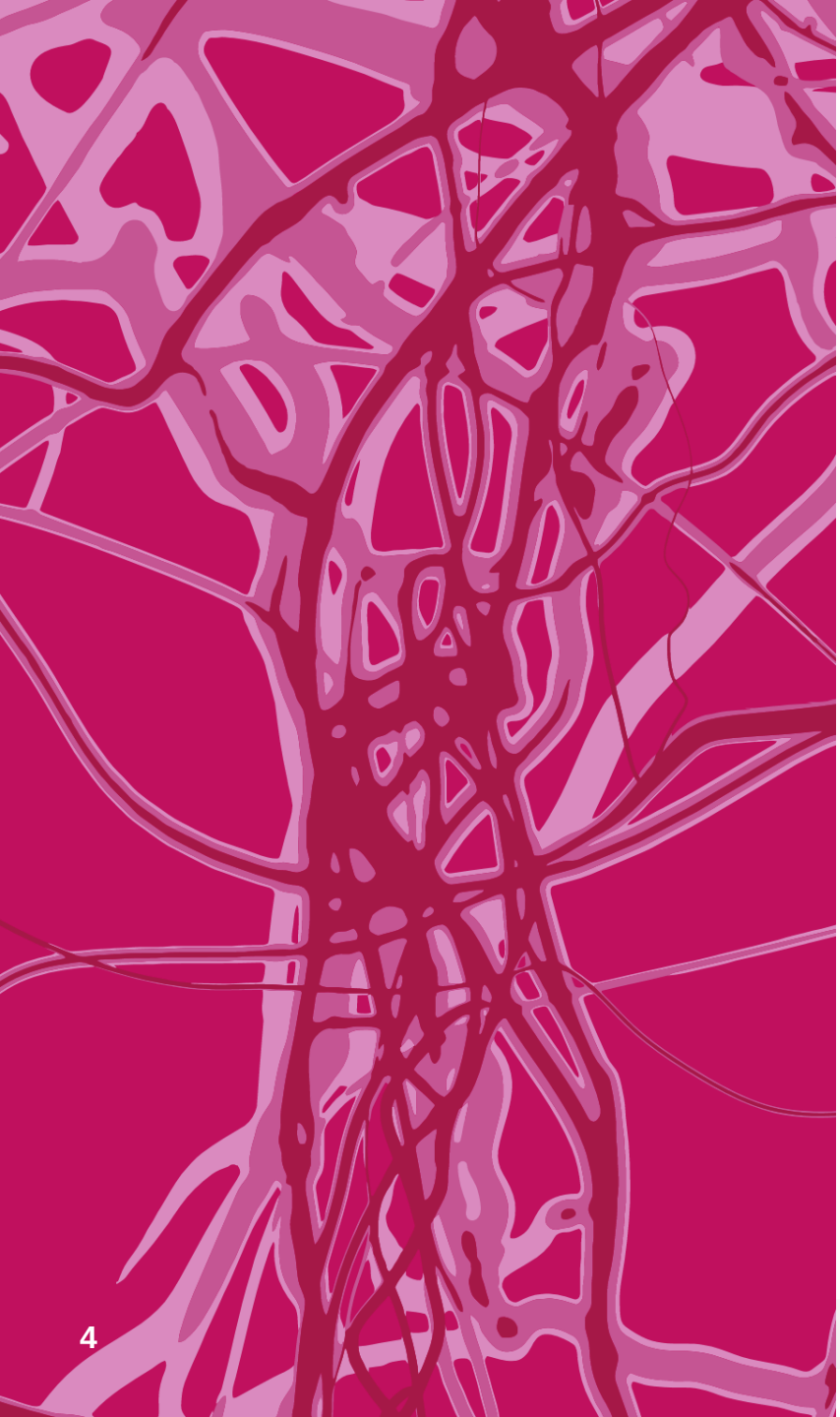
Piglet livability globally



Cargill businesses reported an average piglet livability rate of 83%

Global trend toward larger litter sizes will continue as pork production matures – increasing risk of mortality

Highest number of stillborn reported at 1.5 per litter, highest pre-wean mortality at 17%



Athletes commonly use beetroot juice with has nitrates that convert to nitric oxide. This molecule enhances blood vessel dilation, increasing oxygen and blood flow

Our Concept

Boost nitric oxide

NITRIC OXIDE INCREASES BLOOD AND OXYGEN FLOW

- Induce vasodilation — relax smooth muscle cells lining blood vessels
- Increase farrowing efficiency — shorten duration and reduce sow fatigue

Cargill

Materials and Methods

Location:	Swine Innovation Center, Sterksel (NL)
Genetics:	Topigs 20
Sows:	350. Subsample of 190 sows were monitored intensively.
Treatments:	Dose response of Nitrate (0, 0.03, 0.06, 0.09, 0.12 and 0.15%)
Period:	From day 108 of gestation until 4 days after farrowing

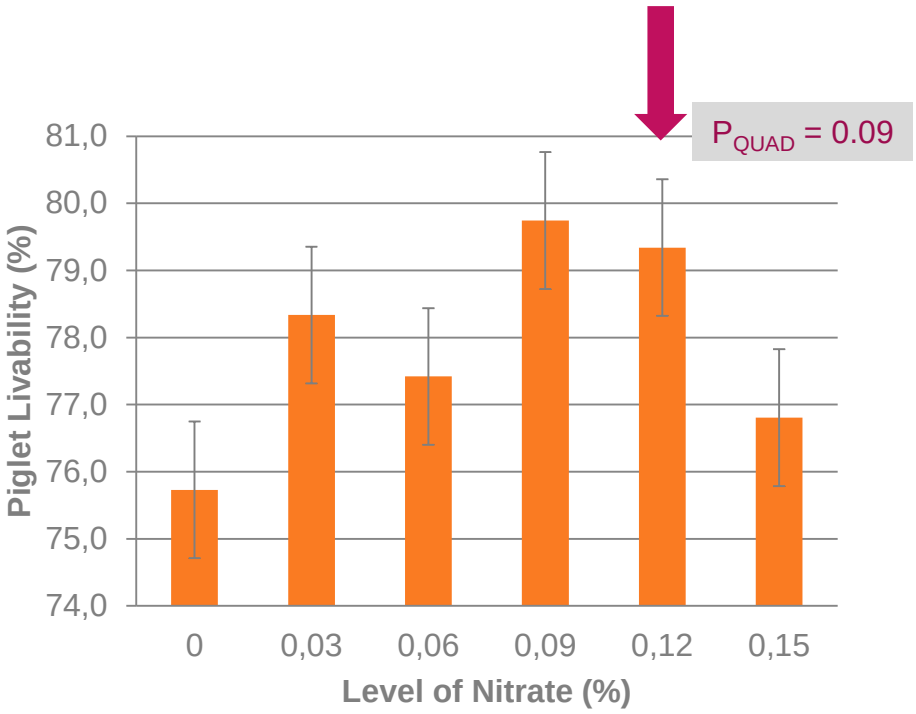
Sow

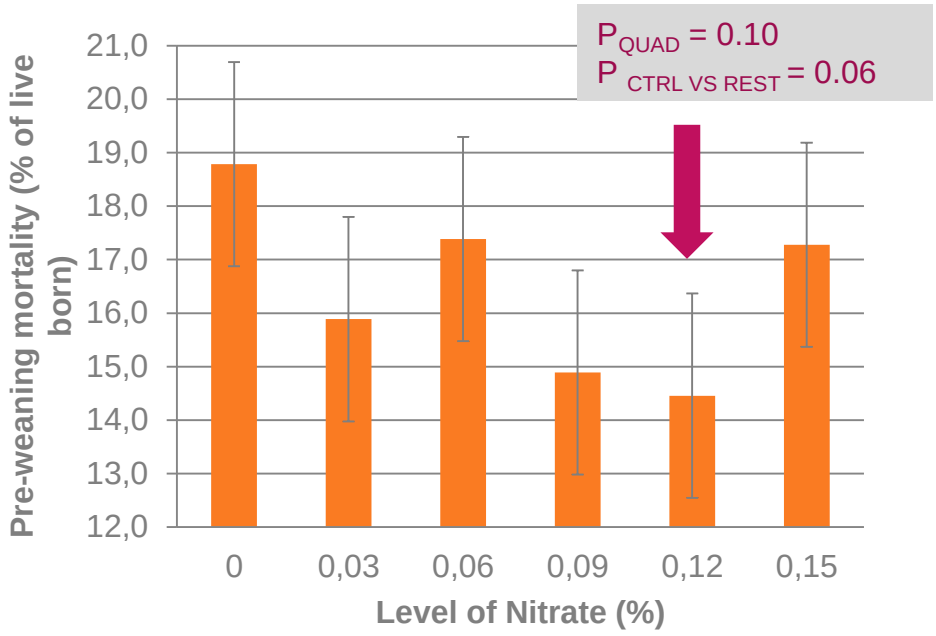
- Reproductive performance
- Duration of farrowing
- Placental characteristics

Piglets

- Vitality score
- Acid base blood parameters of umbilical cord blood
- Birth weight
- Mortality

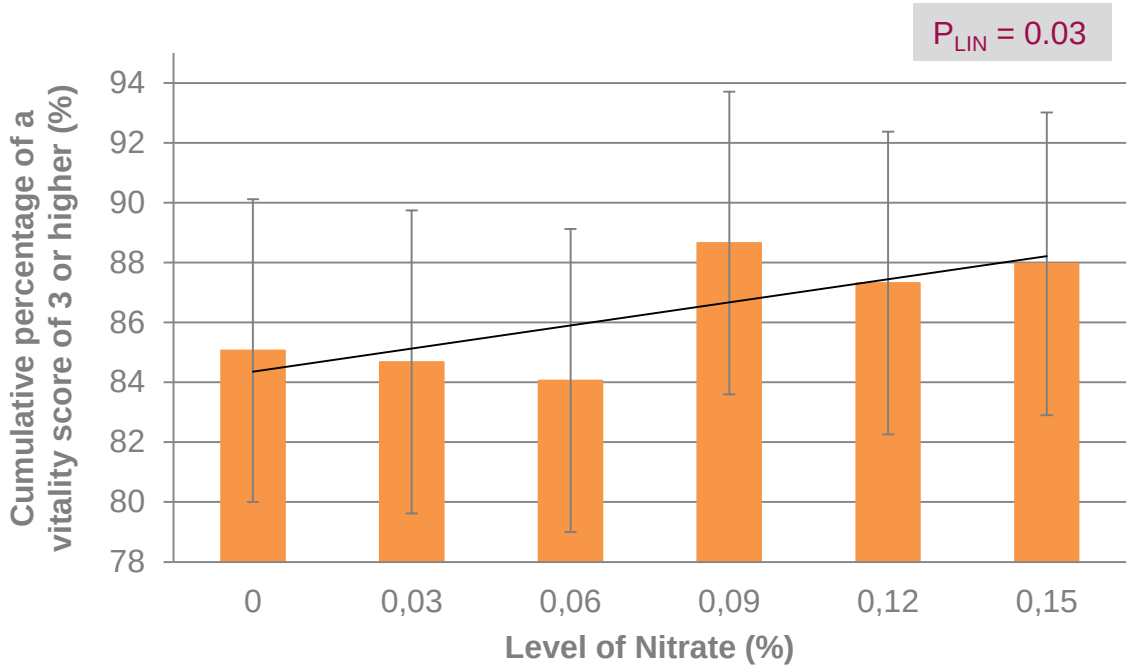
Maternal supplementation of nitrate had a quadratic effect on livability





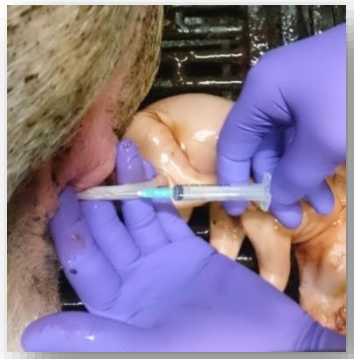
The trial showed a **reduction in pre-weaning mortality of 4.3%** (P quad = 0.12) when piglets were not saved resulting in an **increase in piglet livability of 3.6%**

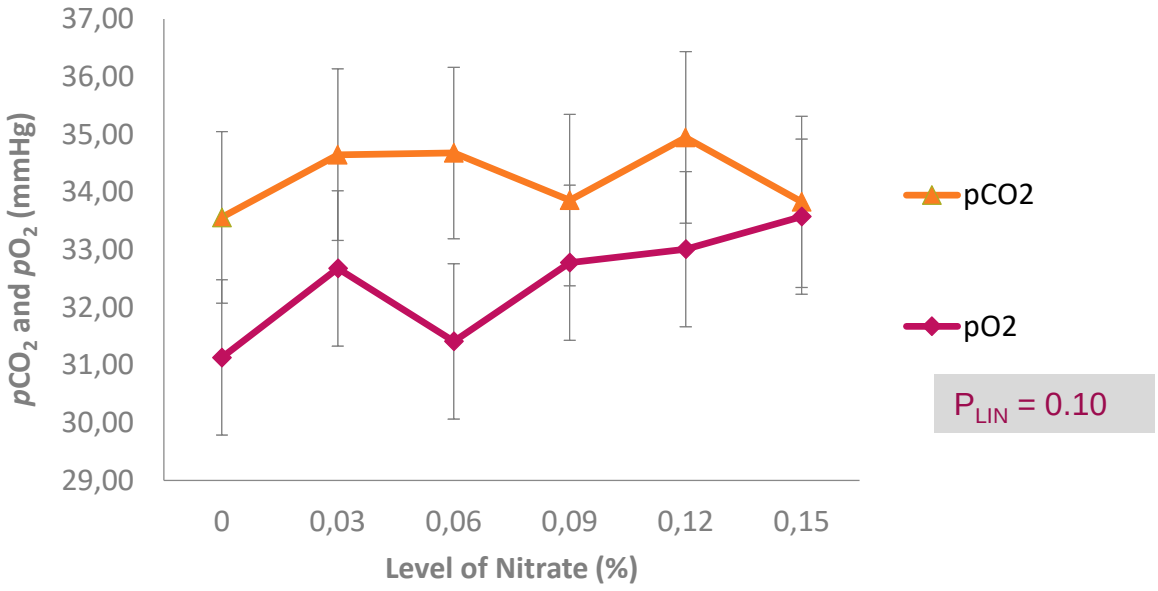
Increased piglet livability is likely driven by an increased vitality



- Vitality of piglets scored right after birth increased when sows received an increasing dose of the Nitric Oxide boosting technology
- Vital piglets are of less risk for hypothermia and reach the udder sooner after birth which increases their chances for survival.

Increased piglet vitality is linked to higher oxygen levels in umbilical cord blood

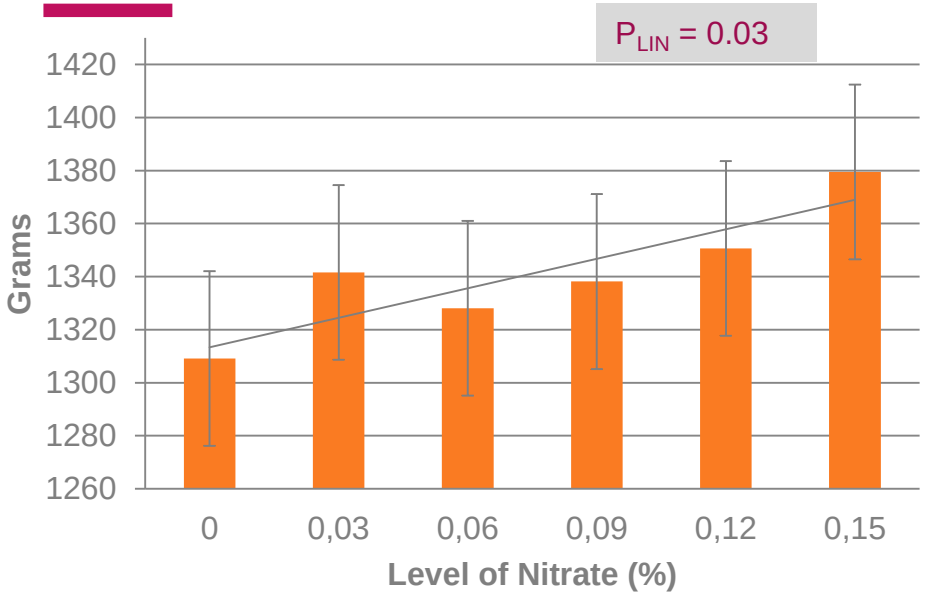


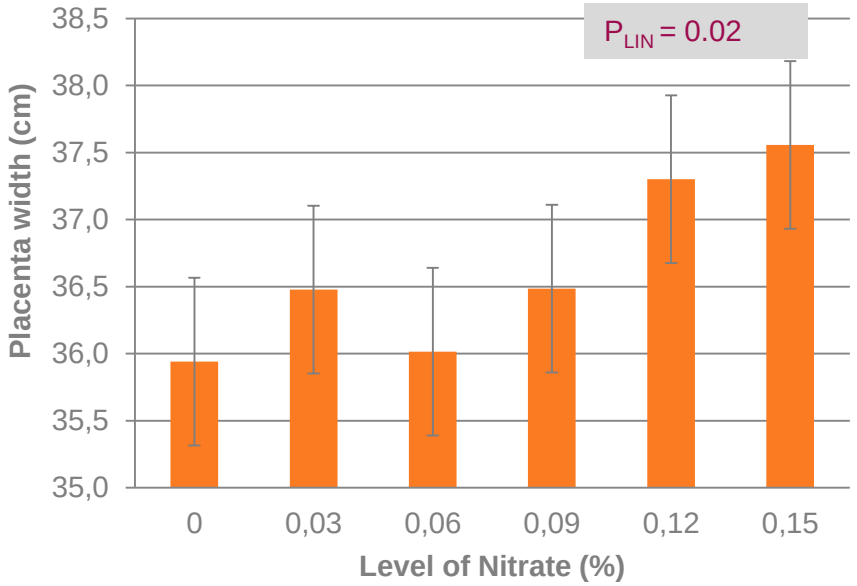


pO_2 concentration in umbilical cord blood right after birth tended to increase as maternal dietary level of the Nitric Oxide boosting technology increased which could explain the increased vitality.

Farrowing duration was not affected

Increased birth weight is caused by an increased placenta size





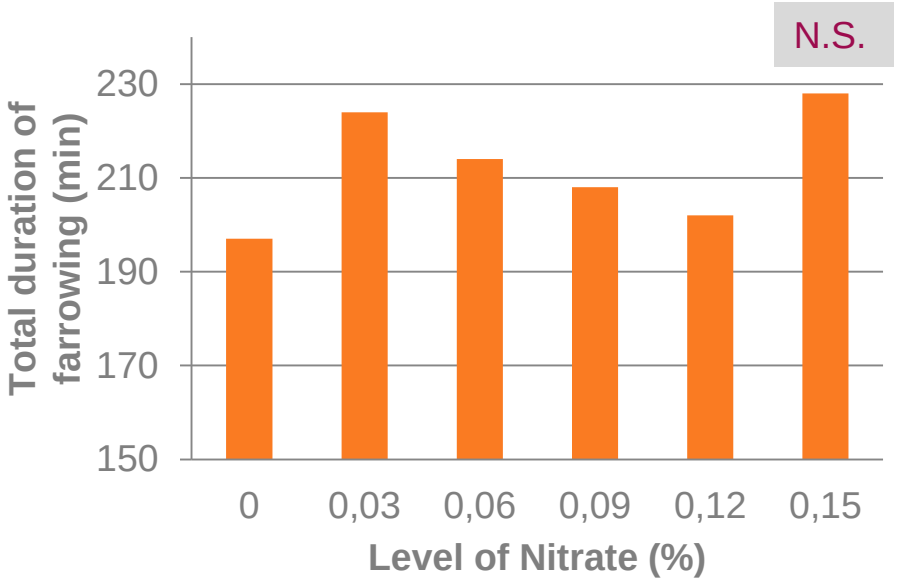
- Piglet **birth weight increased linearly** which might be caused by an increased placenta width and numerically improved placenta length (P = 0.12) with increased dosage.

Farrowing efficiency was not affected

Increased piglet livability was NOT driven by a reduced duration of farrowing

Not Significant

Farrow Duration



- Average duration of farrowing was 236 ± 121 min (ranging between 65 min and 758 min)
- High variation seems the reason why no effect was found.

Conclusions

- Maternal supplementation of nitrate in the perinatal period tended to increase piglet livability
- Increased piglet livability was likely driven by:
  1. Increased piglet vitality through higher oxygen levels in the umbilical blood
  2. Increased birth weight through increased placenta size

Acknowledgements

Staff of Swine Innovation Center Sterksel (VIC)

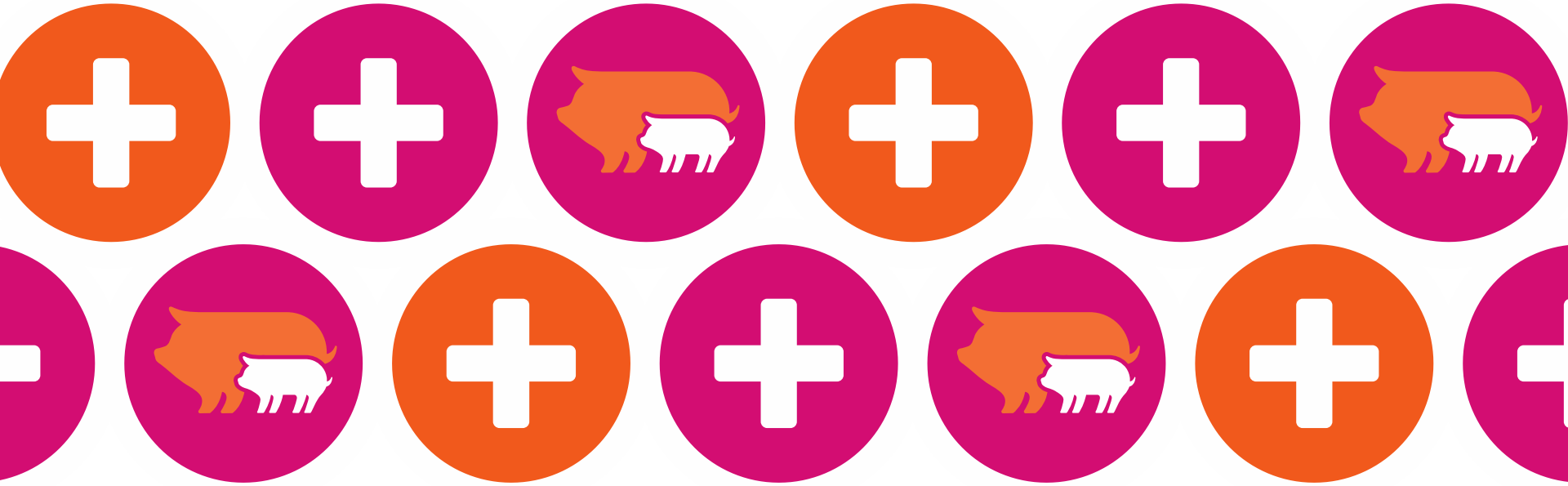
Staff and Students of Wageningen University and Research

- Chantal van den Hoven
- Birgit Schlingmann
- Marloes Vos
- Bjorge Laurenssen
- Fleur Bartels
- Henry van den Brand

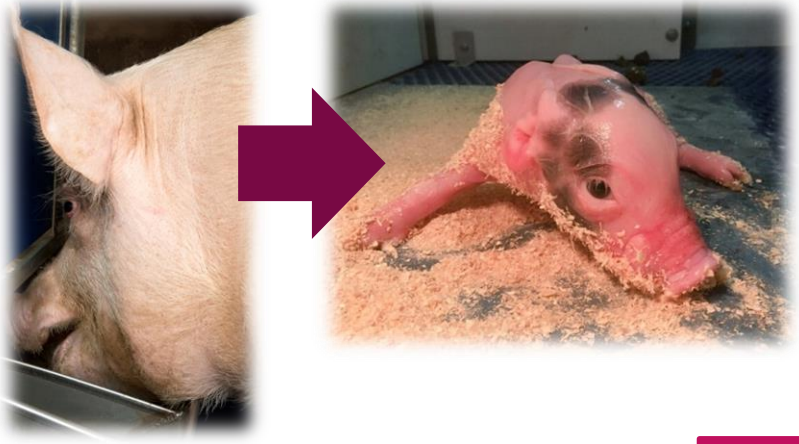
Staff of Cargill Animal Nutrition Innovation Center Velddriel

- Ad van Wesel
- Irene van de Linde
- Delphine Melchior
- John de Laat
- Edwin Looijaard
- Gijs van Drunen

Q&A



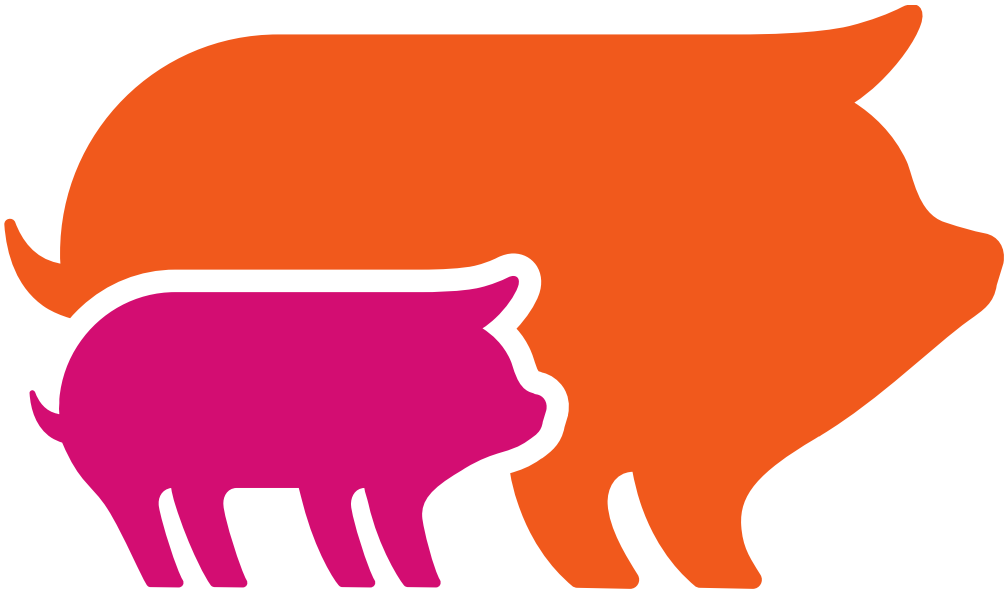
Our Concept fits the biology



Cargill

INTRODUCING

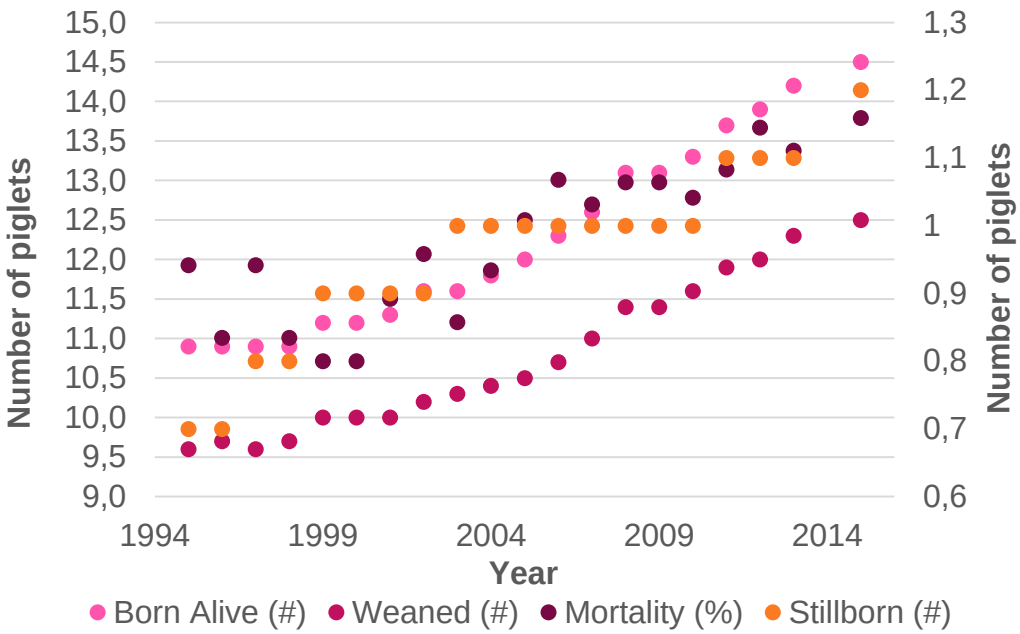
LivaPig™

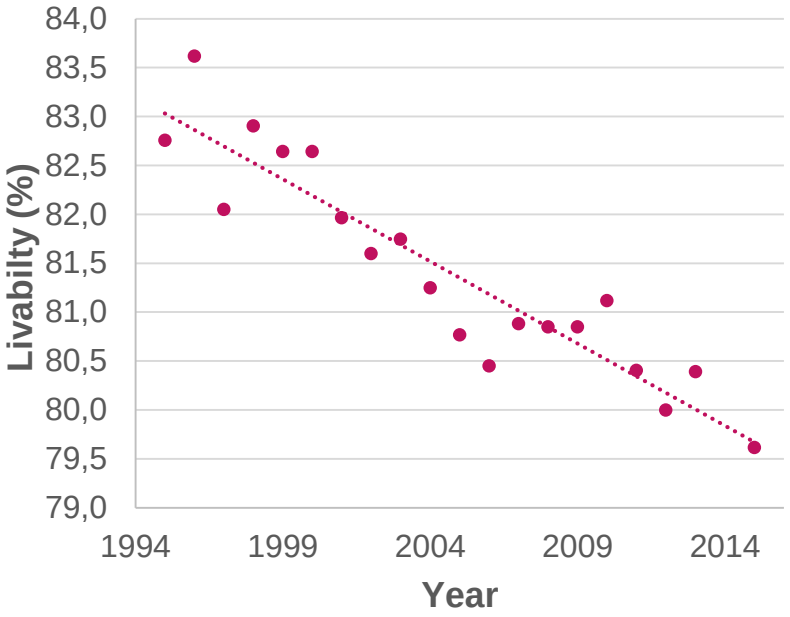


LIVAPIG BOOSTS PIGLET LIVABILITY

- Increases birth weight
- Creates more vital piglets
- Improves post wean gain
- Reduces stillborns
- Reduces pre-wean mortality
- Enhances animal welfare
- Drives profitability

A growing issue





LARGER LITTERS

Global trend toward larger litter sizes

MORE PIGLET STILLBORNS

3–8% of total born are stillborn

HIGHER PRE-WEAN MORTALITY

10–20% of piglets are lost before weaning